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ABSTRACT

This article describes a self rating pre- and post-assessment instrument that has been developed at the Central Michigan University (CMU). Nine instructional modules have been developed and are being used in science methods courses at CMU. Each module focuses on an identified area of competency for elementary science teachers and contains a cluster of specific performance behaviors which the student is to acquire. The self rating assessment instrument was developed to provide students with an opportunity to evaluate their own accomplishment of the course goals and objectives before and after instruction. The goal statements and objectives which had been formulated for each module were used in developing the pre-assessment instrument. This allowed the students to rate themselves as to their accomplishment for each of the course goals. After they complete the self assessment, the students are given an individual profile sheet which lists the nine instructional modules on the left side and the rating scale on the right side. The students are given the numbers of the goal statements and asked to average their ratings for each cluster of statements. When the task is complete each student has a profile which indicates his/her present accomplishment in each area of competence as well as an overall picture of his/her competency related to the total area of teaching science in the elementary grades. (Included is a copy of the assessment instrument.) (DMT)

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A Self-Rating Scale as a Pre and Post Assessment Tool for use with Instructional Modules

By Sandra Harris Gotts

This article describes a self-rating pre and post-assessment instrument that I developed and am now using with my elementary science methods classes at Central Michigan University. The instrument's main use is in providing students with a measure of accomplishment of course goals and objectives before and after instruction. Students also find the pre-assessment results extremely helpful in determining which optional instructional modules are most appropriate for them. In order to effectively describe the instrument and its' utilization, it is necessary to provide a description of our science methods course.

For the past two years we have been experimenting with instructional modules, relatively self-contained units of learning, in some of our elementary science methods classes at Central Michigan University. Nine modules have been developed by myself and Dr. Jack Evans, a colleague who also teaches science methods classes. Each module focuses on an identified Area of Competency for elementary science teachers, and contains a cluster of specific performance behaviors which the student is to acquire. A series of learning tasks arranged and designed to guide the students toward the acquisition of the performance behaviors make up the core of each module. Post-tests were developed for each module to evaluate the extent to which the student can competently perform the specified behaviors.

Five of the nine modules were determined to be basic and the students are required to complete the modules dealing with these basic areas. The

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required Areas of Competency are: Process-Inquiry Skills, Science Equipment and Materials, Textbook Review and Evaluation, Teaching Tactics, and Planning and Evaluation Techniques. The learning tasks contained in the above modules are completed during the regular class meetings. Interaction among the students and between students and instructor is expected and encouraged.

The other four areas, Environmental Awareness, the Metric System, Questioning Techniques, and Classroom Management, were identified as supplemental areas and are offered as optional modules. A student may choose to complete none, one or all of the optional modules. These supplementary modules are completed outside of class and tend to be less dependent upon group interaction.

All nine of the modules were assigned points based upon the relative importance of the specified competencies to be acquired, the amount of time needed to complete the assigned tasks, and the degree of difficulty of the module. When a student completes an instructional module, he/she is given a post test which is designed to evaluate the extent to which the student can competently perform the specified objectives. It was felt that some form of self-assessment should also be provided to allow students to evaluate their own accomplishment of the course goals and objectives before and after instruction. Results obtained from such an instrument could also be used to guide students in the selection of optional modules. The remainder of this article describes the development and present use of the self-rating assessment instrument.

The goal statements and objectives which had been formulated for each

module were used in developing the pre-assessment instrument. This allows the students to rate themselves as to their present accomplishment of each of the course goals. The instrument contains several goal statements related to each identified area of competency. Before beginning the course, the students read each statement and rate themselves using a scale of one to five with the numerical value of one indicating that no progress has been made in accomplishing the goal and the numerical value of five indicating that the goal has been accomplished thoroughly and completely. For example one goal statement reads, "Being able to plan learning activities for children which emphasize the development of inquiry skills such as observing, classifying, measuring, predicting, and inferring". The students indicate their present accomplishment of this goal by marking the appropriate numerical number on the answer sheet provided with the list of course goals.

After they complete the self-assessment, they are given an individual profile sheet which lists the nine instructional modules on the left hand side and the rating scale on the right hand side as illustrated in Figure 1.

Figure 1: Individual Profile Sheet

Modules		1	2	3	4	5
Process	beginning					
	end					
Science Equipment and Materials	beginning					
	end					
Textbook Review and Evaluation	beginning					
	end					
Environmental Awareness	beginning					
	end					
Metric System	beginning					
	end					
Questioning Techniques	beginning					
	end					
Teaching Tactics	beginning					
	end					
Planning Module	beginning					
	end					
Classroom Management	beginning					
	end					
Evaluation	beginning					
	end					

The students are given the numbers of the goal statements that relate to each module and told to average their ratings for each cluster of statements and plot the outcome in bar graph form on the individual profile sheet. For example, the student is told that goal statements numbers one, two and three all relate to the Process-Inquiry Skills module. The three self-ratings for each of these goal statements are averaged together and then the average rating is plotted on the individual profile. When the task is complete each student has a profile which indicates his present accomplishment in each area of competence as well as an overall picture of his competency related to the total area of teaching science in the elementary grades.

Students find the use of the profile extremely helpful in selecting optional modules. Time is not wasted working through a module which deals with an area in which the student already feels competent. In addition, the profiles are useful in evaluating the content of the required modules. If the majority of students have high ratings in a required area, that area is examined closely to determine possible reasons. This kind of evaluative examination results in a determination that perhaps the level of the module is inappropriate and needs revising or the module should be considered as optional rather than required.

If individual students rate themselves high in the required areas, an individual conference is scheduled in which the specific competencies involved are discussed with the student. If it is determined that the student's self-rating is truly reflective of his/her competency in the specific area, then the student is allowed to proceed to the post-test for that module. On the basis of the results from the post-test, the student may be allowed to skip that particular module, or follow the instructor's prescription.

The self-rating pre-assessment instrument has been utilized for two semesters. So far, no student has rated himself or herself high in a required area. This information supports and strengthens the identified course goals and objectives and lends credence to their value.

The same instrument is also used at the end of the course to assess growth in the identified areas of competency. The students rate themselves as before and plot the average rating for each area on the profile sheet below the initial rating done during the first week of the course. This post-assessment

provides the students with a concrete picture of their growth in the specified areas. The profiles have been particularly helpful in providing additional information for use in evaluating the amount of learning and growth that has taken place in each area for each individual student as well as for the class as a whole.

I feel that it is important to provide the students with the opportunity to evaluate themselves. The student's comments related to the use of the self-rating scale support my views. They report that they feel more actively involved and more directly responsible for their learning. The following comment made by a student is typical, "The results of the pre-and post-assessment self-rating makes me realize just how much I have accomplished in each area". I've found that in general, student morale is higher and individual feelings of accomplishment are greater since using the self-rating instrument. I feel the instrument provides a realistic picture of pre and post instructional accomplishment as well as providing the students with the opportunity of being directly involved in the evaluating process.

Elementary Science Methods 340
Dr. Gotts
Achievement Self - rating

A. Rate your present accomplishment of each of the following course goals on the following five-point scale. Make your rating by writing the appropriate numerical value on the answer sheet provided.

5 --- I have accomplished this goal thoroughly and completely, both in its general sense and in its related details.
4 --- I have accomplished this goal at a highly satisfactory level with respect to related details.
3 --- I have accomplished this goal at a satisfactory level, but I have more to learn about its general meaning and with respect to related details.
2 --- I have not accomplished this goal at a satisfactory level, and I have considerably more to learn both in a general sense and with respect to related details.
1 --- I have not made any progress in accomplishing this goal, either in a general sense or with respect to related details.

Goal Statement

1. Understanding what inquiry skills are and how science-as-a-process is different than science-as-a-body-of-knowledge.

2. Being able to use the following inquiry skills: observing, classifying, measuring, space-time relations, communicating, predicting and inferring, in gathering, organizing, and evaluating data.

3. Being able to plan learning activities for children which emphasize the development of inquiry skills such as observing, classifying, measuring, predicitng, and inferring.

4. Being able to define and identify the following teaching tactics:

   a. initiating
   b. focusing
   c. extending
   d. terminating

5. Being able to identify and utilize specific initiating tactics to gain students' attention and relate to their past experiences.

6. Being able to identify and utilize specific focusing tactics to create a common base of experiences related to the instructional objectives of a science lesson.

7. Being able to identify and utilize specific extending tactics to encourage pupils to form a new concept, principle, or skill or apply a concept, principle, or skill in a new situation.

8. Being able to identify and utilize specific terminating tactics to review and summarize a science lesson so that the important points are highlighted and students can be given a chance to demonstrate their understandings.

9. Being able to identify cognitive levels of questioning.

10. Being able to distinguish between different kinds of questions: memory, translation, interpretation, application, analysis, synthesis, evaluation.

11. Being able to ask questions about science topics which would encourage students to use the following intellectual skills: translation, interpretation, application, analysis, synthesis, evaluation.

12. Being able to identify and utilize appropriate reactions to student responses in order to encourage dialogue.

13. Knowing the scope, sequence, and focus of the major experimentally based and developed programs in elementary science: ESS, S-APA, SCIS.

14. Being able to compare, contrast, and evaluate ESS, S-APA, SCIS.

15. Being able to utilize ideas and activities for a "hands-on" approach to elementary science.

16. Being able to identify an appropriate topic for unit of instruction in elementary science.

17. Being able to write instructional and behavioral objectives for a science unit.

18. Being able to identify useful and needed resources to teach a science unit.

19. Being able to identify ways of evaluating student achievement for an elementary science unit.

20. Knowing the state minimal performance objectives in science.

21. Being able to incorporate the state minimal objectives in science into plans for science units and lesson plans.

22. Being able to identify and describe various approaches to elementary science used in specific textbook series.

23. Knowing how to review and evaluate a textbook series in science.

24. Being able to compare and contrast selected elementary science textbook series.

25. Being able to identify, generate and distinguish between content objectives, inquiry skill objectives, psychomotor objectives, and affective objectives involved in short-term teaching strategies.

26. Being able to select and generate appropriate initiating, focusing, extending, and terminating tactics for a short-term teaching strategy in science.

27. Being able to recognize student behaviors which indicate that content objectives, inquiry skills objectives, psychomotor objectives and affective objectives have been achieved.

28. Being able to identify and use environmental awareness activities and strategies which promote environmental problem-solving.

29. Being able to generate ideas for and design and develop appropriate projects which would help elementary students in acquiring knowledge, skills, and a positive attitude toward science.

30. Developing a sense of confidence in your ability to teach science in the elementary grades.

31. Being able to utilize meter sticks, graduated cylinders, equal-arm balances, spring balances, thermometers (celsius and fahrenheit scale) in demonstrating competency in metric measurement.

32. Being able to identify factors in the physical environment that will influence a child's behavior.